

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT (PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA416)	
International application No. PCT/GB 03/02820	International filing date (<i>day/month/year</i>) 30.06.2003	Priority date (<i>day/month/year</i>) 28.06.2002
International Patent Classification (IPC) or both national classification and IPC G06F9/38		
Applicant CRITICAL BLUE LTD et al.		

<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 4 sheets.</p>
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<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the opinion II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application
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Date of submission of the demand 12.01.2004	Date of completion of this report 04.10.2004
Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 </div> </div>	Authorized Officer Thibaudeau, J Telephone No. +49 89 2399-2349



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/GB 03/02820**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-38 as originally filed

Claims, Numbers

1-34 received on 06.07.2004 with letter of 01.07.2004

Drawings, Sheets

1-13 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

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5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-34
	No: Claims	
Inventive step (IS)	Yes: Claims	1-34
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-34
	No: Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB 03/02820

1. Reference is made to the following documents:

- D1: TSAI J-Y ET AL.: "Enhancing multiple-path speculative execution with predicate window shifting" JOURNAL OF SYSTEMS ARCHITECTURE, vol. 45, no. 12-13, June 1999 (1999-06), pages 1075-1095, XP004169214 NL
- D2: MAHLKE S A ET AL: "Effective Compiler Support For Predicated Execution Using The Hyperblock" MICROARCHITECTURE, 1992. MICRO 25., PROCEEDINGS OF THE 25TH ANNUAL INTERNATIONAL SYMPOSIUM ON PORTLAND, OR, USA 1-4 DEC. 1992, LOS ALAMITOS, CA, USA, IEEE COMPUT. SOC, US, 1 December 1992 (1992-12-01), pages 45-54, XP010094789 ISBN: 0-8186-3175-9
- D3: AUGUST D I ET AL: "Integrated predicated and speculative execution in the IMPACT EPIC architecture" COMPUTER ARCHITECTURE, 1998. PROCEEDINGS. THE 25TH ANNUAL INTERNATIONAL SYMPOSIUM ON BARCELONA, SPAIN 27 JUNE-1 JULY 1998, LOS ALAMITOS, CA, USA, IEEE COMPUT. SOC, US, 27 June 1998 (1998-06-27), pages 227-237, XP010291376 ISBN: 0-8186-8491-7

2. **Item V : Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

D1 discloses a method of instruction execution within a microprocessor using predication. A sequence of operations is divided into individual strands (see Figure 2, basic blocks L1-L11), where certain operations from different strands may be executed out-of-order with respect to their original sequential order (see page 1082, column 1, lines 8-16). Each strand has a predicate state that determines whether certain operations from the strand should be completed (see Figure 2, predicate tag associated with each instruction). A short predicate tag width is obtained by using a sliding window of predicates.

D2 discloses a basic predicate mechanism but does not disclose recovery from data speculation.

D3 discloses recovery from data speculation. It uses exception tags which are propagated and uses check operations which cause recovery according to the value of the exception tag.

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None of the prior art documents discloses that the strands be numbered to provide an implicit logical time ordering. The use of said ordering embodied within the strand predicate numbering allows logically later strands to be squashed without the need to propagate exception tags from operation to operation and without the need of having a check operation.